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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/720,280	11/25/2003	Kaoru Fukuda	101175-00041	4752

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EXAMINER

ECHELMAYER, ALIX ELIZABETH

ART UNIT	PAPER NUMBER
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1745

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	04/06/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/720,280

Applicant(s)

FUKUDA ET AL.

Examiner

Alix Elizabeth Echelmeyer

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 January 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) 3-7 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 2, 8-12 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 11-25-03
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

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DETAILED ACTION

Election/Restrictions

1. Claims 3-7 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected species, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on January 23, 2007.

Priority

2. Applicants claim to priority is acknowledged.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claim 1 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In this case, it is unclear what is meant by "pores formed by said pore forming member, equal to or more than 6.0 $\mu\text{l}/\text{cm}^2$ mg." The examiner cannot understand what is meant by the limitation, and reading of the specification has not shed light on the limitation. For the purposes of examination, an electrode catalyst layer having all other limitations of claim 1 will be determined to meet all limitations of claim 1.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1 and 2 are rejected under 35 U.S.C. 103(a) as being unpatentable over Denton et al. (US Patent 6,010,606) in view of Gorman et al. (US Pre-Grant Publication 2002/0086195).

Denton et al. teach a porous gas diffusion electrode for use in fuel cells (abstract, column 1 lines 7-10). Denton et al. teach that the electrode comprises a cathode comprising one or more catalyst components, a non-woven network of carbon fibers, and a polymeric substance (column 3 lines 13-21; column 6 lines 10-12).

Denton et al. further teach that the catalyst is a platinum catalyst on carbon black, with the catalyst mixture being 40 wt% catalyst (column 6 lines 58-65). The polymeric substance is a perfluorosulfonic acid, that is also used as the membrane (column 4 lines 12-15; column 7 lines 22-23).

A combination of 100 wt-parts carbon-supported catalyst with 30 wt-parts perfluorosulfonic acid is taught in Denton et al. (column 6 lines 58-65). Since the carbon supported catalyst is 40 wt% catalyst, 60 wt-parts carbon particles are mixed with 30 wt-parts perfluorosulfonic acid, meaning that the ratio is 2. It has been held that when the difference between a claimed invention and the prior art is the range or value of a particular variable, then a prima facie rejection is properly established when the

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difference in the range or value is minor. Titanium Metals Corp. of Am. v. Banner, 778 F.2d 775, 783, 227 USPQ 773, 779 (Fed. Cir. 1985).

Denton et al teach the components of the catalyst layer of the instant application but fail to teach the specifically claimed pore size.

Gorman et al. teach a water management system for a PEM fuel cell (abstract).

Gorman et al. teach that it is necessary to remove water from the catalyst/membrane interface in order to allow the reactants to reach the catalyst surface; if reactants do not reach the surface, fuel cell performance is decreased. To remove water, a mean pore size of about 20-40 μm is desired ([0013]).

It would be desirable to provide the catalyst layer of Denton et al. with pores of about 20-40 μm to remove water from the catalyst/membrane interface in order to allow the reactants to reach the catalyst surface, preventing a decrease in fuel cell performance.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide the catalyst layer of Denton et al. with pores of about 20-40 μm to remove water from the catalyst/membrane interface in order to allow the reactants to reach the catalyst surface, preventing a decrease in fuel cell performance.

7. Claims 8-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Denton et al. and BBC -Weather Centre.

The teachings of Denton et al. as discussed above are incorporated herein.

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Regarding claims 8 and 10, Denton et al. teach the fuel cell having the claimed components and pore sizes (see above).

As for claim 9, Denton et al. discusses the claimed invention except for the ratio of carbon particles to perfluorosulfonic acid of 1 to 1.6. It would have been obvious to one having ordinary skill in the art at the time the invention was made to vary the relative amounts of carbon particles and perfluorosulfonic acid, since Denton et al. teach that the polymers can be tailored to produce the desired hydrophobic/hydrophilic nature of the electrode catalyst, which improves performance characteristics (column 5 lines 42-49). It has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. MPEP 2144.05 (IIB).

Regarding claims 11 and 12, Denton et al. teach the fuel cell having the claimed components and pore sizes (see above), as well as the use of the fuel cell to power vehicles (column 9 lines 8-11).

Denton et al. fail to teach that the oxidant gas has 50% or more relative humidity.

Denton et al. teach that, in most practical applications of the fuel cell, the oxidant used is air (column 7 lines 28-29).

According to BBC-Weather Center, the relative humidity of air in London, England, where the invention might be used considering the location of the inventors (see [75] of Denton et al.), is often above 50% (see "Friday", "Sunday").

It would have been obvious to one having ordinary skill in the art at the time the invention was made that the oxidant gas used in the fuel cell of Denton et al. would, at

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least some days, have relative humidity greater than 50%, since the fuel cell would be operated in the United Kingdom and would use air as the oxidant gas.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alix Elizabeth Echelmeyer whose telephone number is 571-272-1101. The examiner can normally be reached on Mon-Fri 7-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's trainer, Susy N. Tsang-Foster can be reached on 571-272-1293. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.


SUSY TSANG-FOSTER
PRIMARY EXAMINER

Alix Elizabeth Echelmeyer
Examiner
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